

Georgetown  
University

**BIOMEDICAL SCIENCE POLICY  
& ADVOCACY, MS**

Quick Book

Department of Microbiology & Immunology  
3900 Reservoir Rd. NW | Washington, DC 20057 | Tel: 202.687.3422 | Email: [microbiology@georgetown.edu](mailto:microbiology@georgetown.edu)

Website: <http://microbiology.georgetown.edu/masters/sciencepolicy/>

# Biomedical Science Policy & Advocacy

---



## Introduction

Science Policy and Advocacy have recently come into sharp focus, as the US and the international community struggles with issues in public health, basic research, and biological security. The world of today is in clear need of professionals who are able to grasp and evaluate policy efforts and the science behind them. In an effort to respond to this necessity, the Department of Microbiology & Immunology is offering a Master of Science program in Biomedical Science Policy & Advocacy.

## Program Mission

This new degree aims to provide students with an understanding of policy principles as well as familiarity with essential concepts in the field of biomedical science. We feel that this dichotomy is essential for making educated and effective decisions in the crucial field of science policy today. From stem cell research to bioterrorism, science has quickly come to the forefront of the global health and security agenda and the policy decisions we make as a society will affect us for years to come.

## Faculty Highlights

Most of the faculty members at the Department of Microbiology & Immunology, and within its Virology division, are both teaching professors and active researchers. Research themes currently being tackled in our labs include:

- ✧ Flaviviruses (Dengue, West Nile)
- ✧ Hepatitis viruses (B, D, C)
- ✧ Recognition of mammalian cells and signaling events by the human pathogen
- ✧ Pathogenesis of candidiasis and drug discovery
- ✧ Vaccine development
- ✧ Antiviral drug assays
- ✧ Immune response to infection

## Requirements for Entry

Applicants to the BSPA Program must meet the requirements of the Graduate School of Arts & Sciences. GRE scores should be provided, although MCAT scores may be substituted. A Bachelor's degree should be completed before matriculation.

# Curriculum

---

## First Semester:

- MICB – 502 Interdisciplinary Global Infectious Diseases [3] \*
- MICB – 515 Microbiology of Biological Threat Agents and Emerging Infectious Diseases [3] \*
- MICB – 603 Science and Technology in Global Arena [4]
- MICB – 606 Public Policy for Scientists [3]
- MICB – 612 Immunology [3] \*
- MICB – 702 Regulatory Science and Public Health [2] \*
- MICB – 800 Global Infectious Diseases Interdisciplinary Seminar [2]
- INTH – 354 Health in Conflicts/Crises/Disasters [3] \*
- STIA – 445 Politics of International Health [3] \*

**Note:** Of the six Electives, ( \* ) students must choose two to fulfill their core course requirements.

## Second Semester:

- MICB – 601 Seminar in Science Policy & Advocacy [2]
- MICB – 604 Innovation Systems in Science, Technology, and Health [2] \*
- MICB – 801 Global Infectious Diseases Interdisciplinary Seminar [2]
- BIOL – 362 Shaping National Science Policy [3]
- HEST – 445 Globalization and Healthcare [3] \*

**Note:** Of the two Electives, ( \* ) students must choose one to fulfill their core course requirements.

---

## Additional Electives...

### Biomedical Science:

- MICB – 519 Integrated Biosurveillance
- MICB – 551 Seminar Biological Threat Agents & Emerging Infectious Diseases
- MICB – 560 Principles and Applications of Drug Discovery
- MICB – 629 Mechanisms of Microbial Pathogenesis

### Biomedical Science Policy:

- INTH – 444 Global Patterns of Disease
- NURS – 518 Biomedical Ethics
- NURS – 548 Health Systems and Policies in Transition

### Law Courses:

- LAW – 183 Health & Human Rights
- LAW – 206 Health Law & Policy
- LAW – 364 Public Health Law & Ethics
- LAW – 369 AIDS Law & Ethics
- LAW – 482 HIV/AIDS in Africa Practicum

**Note:** Some of these courses are offered once a year, while others are offered during both semesters.

**Note:** This curriculum assumes that a student is pursuing the degree Full-Time. The Part-Time option is also available, in which case the curriculum will be distributed over a longer period of study determined by the student and not exceeding 3 years.

## Internships Opportunities

---

- [American Association for the Advancement of Science \(AAAS\)](#)
- [Center for Clean Air Policy \(Click on CCAP Jobs link\)](#)
- [Consortium for Science Policy Outcomes in Washington, DC](#)
- [Congressional Research Service \(paid positions\)](#)
- [Cooperative Institute for Research in Environmental Sciences, University of Colorado](#)
- [Christine Mirzayan Internship Program](#)
- [ECONET: Atmosphere and Climate Change](#)
- [World Wildlife Fund](#)
- [Environmental Defense](#)
- [Green Biz Job Links](#)
- [Greenpeace USA](#)
- [Lawrence Berkeley National Laboratory](#)
- [National Academy of Sciences](#)
- [National Center for Atmospheric Research](#)
- [National Sea Grant Knauss Marine Policy Fellowship Program \(fellowship\)](#)
- [Natural Hazards Center Disaster Research Newsletter](#)
- [Nature jobs listings](#)
- [Pew Center on Global Climate Change](#)
- [Potsdam Institute for Climate Impact Research \(Click on News/Jobs\)](#)
- [U.S. Environmental Protection Agency](#)
- [US Department of Health & Human Services](#)
- [World Watch](#)
- [Institute of Biomedical Science \(IBMS\)](#)

## Faculty

---

Joseph A. Bellanti, MD  
Richard A. Calderone, Ph.D.  
John L. Casey, Ph.D.  
Ronald L. Cihlar, Ph.D.  
Michael F. Cole, BDS, Ph.D.  
Jeffrey Collmann, Ph.D.  
Paul J. Cote, MS, Ph.D.  
William Fonzi, Ph.D.  
John L Gerin, Ph.D.

Beverly Jan Gnad, DVM, DACLAM  
David Hartley, Ph.D.  
Herbert Herscowitz Ph.D.  
Gary Jahn, Ph.D.  
Brent E. Korba, Ph.D.  
Dongmei Li, Ph.D.  
R. Pad Padmanabhan, Ph.D.  
Stephan Menne, Ph.D.  
Leonard Rosenthal, Ph.D.

## Adjunct Faculty & Visiting Lectures

---

Kris Beardsley  
Elizabeth Boeggeman, Ph.D.  
William Bonvillian, Ph.D.  
Michael Bray, MD, MPH  
Seth Carus, Ph.D.  
Kevin G. Chen, MD, Ph.D.  
Christine Czarnecki, Ph.D.  
William Daddio, Ph.D.  
Mary Edwards, MS, Ph.D.  
Dave Franz, DVM, Ph.D.  
Davis Garratt  
John Jacocks, MD  
Bob Hawley, Ph.D.  
D.A. Henderson, MD  
Norm Kahn, MD  
Shane Kappler, MD, MS  
Lawrence D. Kerr, Ph.D.  
Kei Koizumi, MS  
George Korch, MD  
Catalina Kovats, MS  
Joseph P. Kozlovac, MS, RBP, CBSP  
Daniel Lucey, MD, MPH, FACP

Susan Martin, MS  
Dennis McBride, Ph.D.  
A. Alan Moghissi, Ph.D.  
Randy Murch, Ph.D.  
Rick Nelson  
Jennifer NUzzo  
Graciela R. Otera, Ph.D.  
Hank Parker  
Neal A. Pollard, JD  
Paul Roepe, Ph.D.  
Francis Slakey, Ph.D.  
Thazepadath Sreevalsan, Ph.D.  
Jeff Stiefl, MS, Ph.D.  
Ryung Suh, MD  
Ben Tannebaum, Ph.D.  
Joe Timpone, MD  
Mike Walter, Ph.D.  
Andrew Webber, MS  
Charles Weiss, Ph.D.  
Catherine Woytowicz, Ph.D.  
Mary Wright, MD

# Course Catalogue

---

**MICB 502: Interdisciplinary Global Infectious Diseases** This course will present a comprehensive view of the global infectious disease landscape through a series of lectures that will first introduce the student to the biology and pathogenic manifestations of specific infectious agents followed by a corresponding lecture on a relevant health policy or program implementation example by an expert with direct experience in the subject. These presentations will cover “high impact” as well as neglected tropical diseases and potential pandemic agents. This course is designed for graduate and undergraduate students from diverse backgrounds that intend to work in an interdisciplinary environment and will benefit from a thorough understanding of all aspects surrounding global health issues.

*3 credits, G. Oстера*

**MICB 515: Biological Threat Agents & Emerging Infectious Diseases**

This beginning course will cover the basic principles of microbiology for graduate students with a wide variety of backgrounds who need a basic understanding of microbiology including bacteriology, virology, and immunology. Introductory lectures on these topics will precede a more in-depth review of biological threat agents and emerging infectious diseases. Issues of Public Policy and Advocacy with respect to biohazardous agents will also be addressed.

*4 credits, L. Rosenthal & Staff*

**MICB 516: Biological & Radiological Safety**

This course will cover the biological safety levels (BSL) for containment working with biological agents - both recombinant DNA and emerging infectious diseases. Radiological safety - will discuss the issues of dirty bombs, containment, and health issues associated with radioactive materials that bioterrorists might employ.

*2 credits, S. Martin & C. Kovats*

**MICB 517: Bioterrorism**

This course explains terrorism in its modern form, and why the use of these weapons is more likely today. In addition, the course presents the major biological and other weapons thought most likely to be used, discusses techniques to use these weapons, and discusses the techniques to prevent and control the effects of these weapons.

*3 credits, W. Daddio*

**MICB 518: Principles of Biodefense**

This course will focus on the threats posed by biological and toxin agents and give a systematic review of past and current biodefense efforts. A history of production and use by state and non-state actors as well as unclassified overview of intelligence and law enforcement information on the biological threat will be discussed. Concepts of target choices and vulnerabilities as well as attack consequences, response efforts, and threat mitigation will also be treated. A field trip to USAMRIID is planned.

*4 credits, L. Rosenthal & M. Bray*

**MICB 519: Sociological Perspectives on Biodefense**

This course will critically examine political and organizational controversies about recognizing and defending against biological threats to human well being. The first third of the course will study historical case studies of biological threat, including threats from food and infectious diseases such as cholera and the flu. This section of the course will demonstrate how biosurveillance, the systematic identification and acknowledgement of a biothreat, depends upon broad social, economic and political factors as well as its biological characteristics. This section of the course will close with a detailed review of the pandemic influenza plans of the US government. The second third of the course examines the debate about reforming our government bureaucracy responsible for responding to biothreats, including but not limited to terrorists. Why did we not recognize the emerging threat of the 9/11 attacks? What principles should we apply in reforming our intelligence and homeland defense organizations? How should we think of natural biothreats from an intelligence perspective? The course concludes with close examination of

sociological perspectives on designing effective organizations for responding to threats including bioterrorism using the US government's pandemic flu plans as a case study. Why do organizational failures occur even in organizations capable of responding to novel threats and unanticipated events? We will close the course by examining how one society responded to a major biological catastrophe, the explosion of the Chernobyl nuclear plant in Ukraine. By the end of this course, students should gain an appreciation of the fundamentally political character of biodefense.

*3 credits, J. Collmann*

### **MICB 520: Agroterrorism: Animal, Plant & Homeland Defense**

This course will cover historical and contemporary aspects of intentional introduction of microbial and chemical agents in the food chain with specific emphasis on animal viruses like foot-and-mouth disease, mad cow, Rift Valley fever, hog cholera, highly pathogenic avian influenza West Nile, and New Castle Disease. Plant pathogens, such as soybean rust will be covered. Moreover animal and plant agent lists will be discussed to include human crossover agents. Discussions relevant to first responders will be detailed.

*3 credits, L. Rosenthal & USDA Faculty*

### **MICB 521: Biosurveillance: An Applied, Multidisciplinary Perspective**

This course will cover managing biological threat through biosurveillance. A laboratory component will examine medical, animal, zoonotic, crop, and food surveillance - as well as detection of catastrophic bioevents. Students will participate in simulations of bioterrorist attacks to illustrate the use of surveillance to trigger response.

*3 credits each, J. Collmann & J. Wilson*

### **MICB 522: Introduction to Lab Animal Science**

The purpose of this course is to provide instruction in basic laboratory animal biology and husbandry and an introduction to federal animal welfare regulations, ethical considerations of animal use and animal models used in biomedical research.

*2 credits, J. Gnad*

### **MICB 523: Biodefense Public Health Counter-measures**

This course will examine four Public Health countermeasures against biological threat agents: vaccines, antimicrobials, isolation, and quarantine. Detailed analyses of the SARS outbreak of 2003, the anthrax attacks of 2001, and the US smallpox vaccination program will include lessons learned that can be applied to preparing for pandemic influenza, pneumonic plague, or catastrophic bioterrorism as anticipated by the US Cities Readiness Initiative. Vaccines, both licensed and investigational, will be emphasized throughout this 30-hour course. The FDA regulatory process required for the study and licensure of vaccines will be also detailed. Grading will be based on a written exam and on a term paper that focuses on an area chosen by the student. After submission of the final paper it must be defended.

*2 credits, D. Lucey*

### **MICB 524: Emerging Diseases: The Past as Prologue**

This course will study recent infectious disease outbreaks including Marburg virus in Angola 2005; Nipah virus in Bangladesh 2004, Monkeypox in the USA 2003, SARS in Hong Kong and Toronto 2003, West Nile Virus in the USA 1999-2006, Plague in India 2004, Hantavirus in the USA 1993, and the HIV/AIDS pandemic 1981-2006. Emphasis will be two-fold: (1) the interaction between the infectious disease pathogen and the human immune response, and (2) common public health and political themes in these outbreaks and how they will help prepare for future emerging (entirely novel) or re-emerging diseases (new within a given environment) diseases. Students will participate in a "tabletop exercise" on how to manage an emerging disease outbreak.

*2 credits, D. Lucey*

**MICB 525: Homeland Security**

This course will delve into the future on what homeland security will be like in year 2015. Current assessments and future predictions will be analyzed. Threats, trends, and implications for homeland security in 2015 will be examined.

*3 Credits, N. Pollard & E. Prescott*

**MICB 526: Chemical Threat Agents**

The Threat of Chemical Weapons is a survey of chemical weapons issues with an eye toward health-related topics. Students will review the key institutions, individuals, and instruments involved of science and technology (S&T) policy with respect to chemical agents.

*3 Credits, C. Woytowicz*

**MICB 530: Principles of Infectious Disease Epidemiology**

This semester-long course will introduce the basic methods for infectious disease epidemiology (including definitions and nomenclature); will describe and analyze the factors related to the emergence, transmission, and spread of infectious diseases which are current and expanding global public health problems; and will apply epidemiological principles to case studies and historically significant disease outbreaks. This course will describe strategies for preventing, responding, controlling, and mitigating the impacts of disease epidemics. Instruction will focus on lecture, problem analysis, and student-centered discussion.

*2 Credits, E. Gursky*

**MICB 550: Pathogenesis & Therapy of Bioterrorism Related Diseases**

Microorganisms and toxins that could be employed by terrorists as biological weapons have been ranked in the order of their potential threat as Category A, B and C agents by the National Institute of Allergy and Infectious Diseases. This course will examine the mechanisms by which the most virulent (Category A) and certain Category B and C agents cause severe illness in humans and laboratory animals and will review current approaches to the treatment of these diseases. Students enrolling for this course should have completed MICB-515 or have an equivalent background in biology and immunology.

*2 Credits, M. Bray*

**MICB 551: Seminar in Biohazardous Threat Agents**

Individual topics will vary depending on the expertise of each speaker.

*1 credit, L. Rosenthal & Staff*

**MICB 560: Principles and Applications of Drug Discovery**

This is an elective multi-disciplinary course and focuses on various human diseases for which development of therapeutics are needed. In the first part of the course, the course will cover basic principles of medicinal chemistry, strategies and techniques used in structure activity relationship and pharmacore identification. The course will also cover synthesis, selection and optimization of drug-like compounds using a variety of modern techniques such as molecular docking based on known three-dimensional structures of therapeutic targets as well as structure determination of target/ligand complexes by using X-ray crystallography, NMR and/or proteomics. In the second part of the course, applications of drug discovery to specific human diseases. This part will include development of new antibiotics to combat drug-resistant bacteria, anti-fungal, antivirals (HIV-1, HBV/HCV, Flu, HPV and flaviviruses), and anti-malaria drugs as well as drugs against CNS disorders and human cancers.

*2 Credits, M. Brown & R. Padmanabhan*

**MICB 566: Preparedness, Response, and Capacity to CBRNE Threats** This elective course/seminar is focused on exploring the medical effects and response to a nuclear/radiological, chemical, biological threat with special emphasis on a bioterrorism attack. Additionally, the course will include a current analysis of the capacity of the US system to withstand the effects of a major CBRNE attack. It will also evaluate the H1N1 Pandemic Influenza as a case study for preparedness.

This course will move from addressing the threats presenting to individuals to threats presenting to communities (local, state, national) based on the potential medical and system outcomes for both. Specifically, it will address both individual medical outcomes and treatment strategies of disease, and

larger community, state, and national outcomes and response strategies for an attack.

The course will be lecture based with interactive classes included throughout the syllabus. It will include expert guest lecturers from Georgetown University Emergency Medicine Faculty and the Department of Homeland Security. We will include class discussions and group exercises to foster adult learning strategies.

*1 Credit, S. Kappler, MD*

### **MICB 577: Defense Threat Reduction Initiatives**

This elective course is focused on exploring the various aspects of how the US government, specifically the Department of Defense, works to safeguard America and its allies from weapons of mass destruction (chemical, biological, radiological, nuclear, and high yield explosives) by providing capabilities to reduce, eliminate, and counter the threat, and to mitigate its effects. An initial analysis of the current and potential nuclear/radiological, biological and chemical threat will set the stage; and the medical effects of these weapons will be briefly reviewed. Various threat reduction strategies and their medical consequences including the Chemical Weapons Convention and the Strategic Arms Reduction Treaty will be surveyed. Moreover, elimination efforts such as the Chemical Demilitarization Program will be covered. Public health and medical consequences related to the enormous task of mitigating the effects of a WMD will be covered. The course will consist primarily of lecture/discussion format with readings designed to enhance student knowledge and provoke discussion; and subject matter experts from various government agencies will present their respective roles in this realm.

*2 Credits, R. Suh & J. Jacocks*

### **MICB 584: Introduction to Microbiology**

Introduction to the disciplines of microbiology and immunology through presentation and exploration of several topics of major current interest. Each lecture will begin with a broad introduction to the subject, followed by a discussion of how the topic has been approached experimentally and the impact of recent advances. Potential topics covered include: antigen presentation, natural killer cells, development of antifungal therapeutics, commensal bacteria and the immune system, and host responses to viral infection and viral countermeasures.

*1 credit, J. Casey*

### **MICB 603: Science & Technology in the Global Arena**

This course is an introduction to how science and technology affect foreign affairs, and how international affairs influence science and technology. It is the gateway course required of SFS juniors majoring in science, technology and international affairs (STIA), and College science majors taking the STIA certificate. It may also be taken by undergraduates and graduate students from anywhere in the university without special permission. It has no prerequisites, and is suitable both for the policy generalist and for students with backgrounds in science. The course uses examples drawn from environment, security, nuclear policy, information, communications, energy, homeland defense, health, and manufacturing technology, and explores issues of sustainability, scientific risk and uncertainty, the links of science and technology with economics and geopolitics, scientific advice to governments, and government support to research and innovation. It explores the role of technological innovation in increasing productivity and competitiveness, and in solving critical social problems.

*3 credits, C. Weiss*

### **MICB 604: Innovation Systems in Science, Technology & Health**

This course focuses on science and technology policy. It will examine the science, technology and health innovation system, with a particular focus on public policy and the federal government's role in that system. It will review the foundations of innovation systems theory and organization, and the range of approaches to science and technology policy, and build toward a sophisticated understanding of these areas. Emphasis will also be placed on examining the organization and role of medical science innovation agencies, gaps in the health innovation economic model, and on policies that could help fill those gaps in health innovation. The mechanisms through which government obtains the science advice that is increasingly important to public policy will be discussed as well as the future of the science talent base. The class will review pending proposals for improving the government-related elements of the innovation

system on an ongoing basis.  
*2 credits, W. Bonvillian*

**MICB 605: Principles of Science, Health, and Technology Policy**

A study of interactions between, technology, and public policy with an eye towards health-related topics. The class will examine who brings advice, what content is communicated, who uses it, and how it becomes public policy.

*3 credits, C. Woytowicz*

**MICB 606: Public Policy for Scientists**

This interdisciplinary course will provide introductory lectures in a variety of fields that pertain to biomedical science policy & advocacy. Lectures will cover relevant federal agencies, prominent science advocacy groups and techniques, principles of health economics, funding of research activities, the interaction of science & industry, as well as some controversial issues in science policy such as biodefense, stem cell research, and climate change. Students will be left with a multi-faceted understanding of the environment that shapes biomedical science policy and the scientists' role in this arena.

*4 credits, R. Calderone & Staff*

**MICB 607: General Medical Microbiology & Immunology**

The course consists of lectures and laboratories that integrate the basic concepts of microbiology and immunology with the role of microorganisms as pathogenic agents. Major emphasis is placed on bacteria, viruses, fungi and parasites in infectious disease. The clinical applications of immunology are also discussed. (Note that the course is on the Medical School calendar, beginning in late August and ending in mid-February.) Students who wish exposure only to one part of the course (immunology, bacteriology, virology) are encouraged to consider enrolling in one of the three courses existing for this purpose (609, 610, 611, respectively)

*7 credits, R. Cihlar & M. Cole*

**MICB 608: Fundamentals of Medical Immunology & Microbiology**

Introduction to fundamental concepts of Medical Microbiology and Immunology with emphasis on host defense mechanisms and the role of microorganisms in infectious diseases. Lectures will cover basic principles and clinical applications of immunology, bacterial physiology and genetics, and the role of pathogenic bacteria, fungi and viruses in human diseases.

*2 credits, R. Cihlar & M. Cole*

**MICB 609: Introductory Immunology**

Introduction to the basic principles of immunology and immunogenetics. The course is offered as the first quarter of MICB-607 and is taught during the months of August and September. It is recommended for students who wish exposure to only the immunology section of that course. Permission of course director is required.

*2 credits, R. Cihlar & M. Cole*

**MICB 610: Introductory Bacteriology**

Introduction to the basic principles of bacterial physiology, genetics, and pathogenicity. The course consists of the second quarter of MICB-607 and is taught during the months of October, November, and December. It is intended for students who wish exposure only to the bacteriology section of that course. Permission of course director is required.

*2 credits, Dr. R. Calderone & staff*

**MICB 611: Introductory Virology**

Introduction to the basic principles of virology with emphasis on human pathogens. The course consists of the third quarter of MICB-607 and is taught during the months of January, February, and March. It is intended for students who wish exposure to only the virology section of that course. Permission of course director is required.

*2 credits, Cole & staff*

**MICB 612: Immunology**

The course will focus on the cells, organs and molecules of the immune system and how they contribute to discrimination of self from non-self. The paradigm used in the course will be the host response to infectious agents. Hypersensitivity, autoimmunity, graft rejection and tumor immunity will be considered as variations in the basic protective function of the immune system.

*3 credits, M. Cole & M. Maric*

**MICB 613: Introductory Bacteriology Lab**

Laboratory section taught concurrently with MICB-610. Lab work includes general methods associated with the culture and identification of medically important bacteria and fungi. Laboratory fee is required of students not enrolled in departmental degree programs.

*1 credit, M. Cole*

**MICB 614: Bacteriology & Mycology**

The course will focus on principle human pathogenic bacteria and fungi. The host-pathogen relationship and antimicrobial therapy will be grounded in an understanding of the structure and physiology of medically important prokaryotes and lower eukaryotes.

*3 credits, M. Cole*

**MICB 619 Biology/Biochemistry of Viruses**

This course will cover the general principles of virology. Topics will include: the effects of viruses on human health and disease; laboratory approaches to studying viruses; virus structure and mechanisms of replication; host responses to virus infection and viral counter-responses; virus engineering - including vaccine development and gene therapy; the role of virus ecology in emerging viral diseases. The focus will be primarily on viruses that affect human health.

*3 credits, J. Casey*

**MICB 621: Human & Microbial Genetics**

This course introduces current concepts in human, prokaryote and yeast genetics, with emphasis on the use of bacteria and yeast as research tools in molecular genetics. Classical genetics through genomics and post-genomics approaches are presented through lectures and group discussions.

*3 credits, R. Calderone*

**MICB 622: Advanced Techniques in Microbiology I**

Practical course in the application of modern molecular methods to the study of infectious diseases. Limited to Department of Microbiology and Immunology graduate students; advisor/instructor permission required.

*3 to 6 credits, W. Fonzi*

**MICB 629: Mechanisms of Microbial Pathogenesis**

A course designed to explore the varied ways pathogenic bacteria overcome natural host defense, to describe host responses to infection, and to discuss the network of interactions between pathogen and man at the molecular and cellular level.

*3 credits, M. Cole*

**MICB 650: The Human Immune System in Health & Disease**

At the completion of the course the student will understand how the immune system recognizes foreignness outside and inside the body; the tissue damaging consequences of the immune system when it fails to distinguish between self and non-self and the value of immunological reagents in diagnosis and treatment of disease.

*2 credits, M. Cole*

**MICB 660: National and Global Health Law: O'Neill Colloquium**

In this interdisciplinary colloquium, leading national and international scholars in a range of domains will explore fundamental normative and policy problems of contemporary concern in health law. Topics will include health care, public health, global health, science, regulation, politics, ethics, and policy. The

colloquium will have participants from across the Georgetown University campus among faculty, senior administration, and students, as well as participants in the Washington health policy and legislative community.

Each seminar session will focus on a presentation by, or structured dialogue with, a distinguished guest speaker. Students from the Law Center and other schools within Georgetown University (including Nursing and Health Studies, Medicine, Arts and Sciences, Foreign Service, Business, and other graduate programs) will be expected to prepare for intensive discussions in which experts, faculty and students explore, analyze and deepen their understanding of issues selected for consideration each month. The colloquia will be open to other students and faculty members across Georgetown University as well as interested members of the public, particularly professionals working in health law and policy in Washington.

*3 credits, G. Lawrence & J. Monahan*

**MICB 702: Public Health Regulatory Science** This course begins with the fundamental treatment of the unique nature of regulatory science -- how science is used in regulatory, legislative, executive, and judicial decisions and affairs and scientific and other (e.g. communication) competencies that are needed to respond to regulatory requirements. This includes an overview of the development of regulation as a living product of public administration and public policy. The course covers methodological regulatory science beginning with health risk assessment, and an overview of regulatory economics. With this as a foundation, the course provides a concentrated treatment of specific regulatory public health topics ranging from regulatory atmospheric sciences to regulatory toxicology and regulatory pharmacology.

*2 credits, D. McBride & A. Moghissi*

**MICB 800 & 801: Seminar - Global Infectious Diseases**

This graduate seminar is a unique combination of presentations by experts in biomedical sciences, policy, and social science that are united by key topics in global infectious diseases. The purpose of this seminar series is to provide a venue for the discussion of interdisciplinary research and development that acknowledges how the world has become a global system for the propagation of infectious disease.

*2 credits, Staff*

**MICB 825: Social Propagation of Global Infectious Disease**

This course will examine the hypothesis that the world has become a global system for the propagation of infectious disease. Beginning with an analysis of global trade and the spread of infectious disease, we will carefully study the economic, social and political conditions that have increased both the biological threat of, and human vulnerability to infectious disease throughout the world. In studies of the United States and Brazil, we will focus in detail on how the experience of poverty affects peoples' sense of risk, particularly for sexually transmitted diseases such as AIDS and cervical cancer. In studies of Haiti, Venezuela, and other countries, we will extend that analysis by examining how social inequality helps structure the global distribution of contracting and receiving treatment for infectious diseases such as tuberculosis, cholera and malaria in the developed and developing world. We will finish the course by examining how countries throughout the world have increased human vulnerability to infectious disease by undermining their public health infrastructures. After completing this course, students should better understand the complexity of global infectious disease as a biological, sociological, economic and political phenomenon.

*2 credits, J. Collmann*

**MICB 852: Seminar - Microbiology & Immunology**

Individual topics will vary depending on the expertise of each speaker. PhD students will attend all lectures and give seminar presentations covering progress of their work.

*2 credits, R. Calderone*

**MICB 900: Tutorial Internship**

*0-3 credits, Staff*

**MICB 930: Immunology Journal Club**

The Immunology Journal Club is designed to help students learn to evaluate data in a critical fashion and to present ideas in a group setting. The Immunology Journal club will meet on a weekly basis.

Graduate students, postdoctoral fellows, and faculty will select Immunology-related articles from the recent literature. Students will lead discussions of the articles. To receive credit, students will be required to present a paper at least once per semester. Students will also write a short evaluation of the presentation and article analyzed each week. Students may only register for credit once.

*0 or 1 credits, M. Maric & S. Singer*

## Cross Listed Course

---

### **BCHB 517: Cancer Biology**

The Cancer Biology course is designed to provide a broad understanding of the molecular, genetic, cell biology, and pathobiological aspects of cancer. This course will cover topics in the concepts of the role of oncogenes, tumor suppressor genes in human cancers, some major signaling transduction pathways, gene regulation, apoptosis and stem cells in cancer. In addition, targeted cancer therapy will be also introduced.

*1 credit, Careen, T.*

### **BCHB 518: Introduction to Laboratory Applications in Biotechnology**

An introductory hands-on, laboratory-based course that introduces students to core techniques such as electrophoretic analysis of nucleic acids and proteins, polymerase chain reaction (PCR), Southern blotting, ELISA and western blotting, protein purification, tissue culture, DNA cloning, and Bioinformatics.

*4 credits, Chirikjian, J.G. & Helling, S*

### **BCHB 528: Modern Methods of Molecular Biology**

Detailed description of methods used for analysis, purification, quantitation of nucleic acids and proteins.

*3 credits, M. Martin, B. Wolf & faculty*

### **BCHB 521: Bioinformatics**

A mixture of lectures and hands-on sessions with introduction to bioinformatics concepts, methods, databases and applications, covering genomic sequence analysis, molecular evolution, and protein sequence, structural, functional analysis. Non-bioinformatics major students can take individual units of this course on Genomic Sequence Analysis (BCHB-571) and Protein Sequence Analysis (BCHB-572)

*3 credits, C. Wu*

### **BIOL 362: Shaping National Science Policy**

Students will learn techniques that shape our nation's science policy. We will start with an introduction to our political system. Then we will examine hardball politics with guest lectures from journalists, lobbyists, and congressional staff. Finally, we will focus on case studies in advocacy and examine how science affects policy at the local and national levels. Students work on one project throughout the semester.

They will break into teams, identify a politically hot science-issue, develop a lobbying strategy, and take their issue to Capitol Hill. This course is cross-listed with the Physics Department. Spring. (NB: 1 credit may apply to Biology major)

*3 credits, F. Slakey & Elizabeth Turpen, Office of Senator Lugar*

### **CBIO 539: Molecular Cell Biology**

This course covers topics in the disciplines of Cell Biology, Cell Signaling, and Developmental Biology for advanced undergraduate, graduate, and medical students. The major topics covered include: cytoskeletal organization; cell adhesion; extracellular matrix; cell signaling; cell cycle; tissue biology/histology; early development and patterning; and organogenesis.

*4 credits, P. Banerjee, S. Byers, E. Crooke, G. Gallicano, S. Mueller, B. Roman & C. Underhill*

### **HEST 445: Globalization and Health Care**

This course examines economic, social, cultural, environmental, technological and political dimensions of globalization and how they impact on health status, the provision of health care and international public health. The course will look at what globalization means for both industrialized and developing countries with a focus on opportunities and risks for health. It will also examine in depth the transnational legal frameworks, the international institutions and the civil society players that influence and respond to the globalization process.

*3 credits, B. Liese*

**INTH 444: Global Patterns of Disease**

This course reviews and analyzes recent trends in global health, current problems of health, and the influence of economic, population and social trends on health and living conditions in different countries. The student will acquire the basics of descriptive and analytical epidemiology and key health indicators used in international comparisons. This course discusses questions raised by the World Health Organization's World Health Report 1998: Will the world continue to grow healthier in the 21st century, with more diseases conquered by scientific advances and life expectancy extending ever longer, or will new diseases, failing drugs, poverty, and socioeconomic gaps cancel out these gains? How does the health situation of the U.S. compare with other countries? How can the health situation of the population in developed and underdeveloped countries be improved? Looking at major determinants of health and disease in different national contexts, the student will analyze the main transnational factors that influence the transfer of risks to health and the structural conditions that determine one country's vulnerability in a globalized economy.

*3 Credits, J. Teruel*

**INTH 449: Health in Conflicts, Crises, and Disasters**

This new course will provide an opportunity for students to become acquainted with the problems related to emergencies and crisis situations and the methods used for preparedness, mitigation and cooperation among countries. Natural or manmade disasters, wars and conflicts, produce situations of emergency with high impact on the life of exposed population groups. There is a disruption of life conditions and the health of the people is, most of the time, immediately affected. There is substantial information on the causes, history, frequency, duration and consequences of the most important disasters, crisis and conflicts in the world, as well as the responses of local, national and international agencies and governments and the mistakes, accidents and lessons learned. Students will analyze information from historical and recent crises, emergencies and disasters using special reading material, videotapes of cases and simulations.

*3 credits, J. Teruel*

**LAWJ 369: AIDS Law and Ethics**

This course examines the social, legal, political, and ethical controversies surrounding the HIV/AIDS pandemic in the early twenty-first century. It covers both domestic and international policy. The course is divided into several parts. Part I, AIDS in the Courtroom, covers the major court cases related to HIV/AIDS in the United States. These cases demonstrate the social impact of AIDS— the effect of litigation on social institutions, constitutional law, and interpersonal relationships. Part II, Rights and Dignity, examines the role of international human rights, privacy, and discrimination. Part III, Policy, Politics, and Ethics, covers the most contentious debates of the HIV/AIDS epidemic, including testing, named reporting, and civil and criminal confinement. Part IV, Special Populations, covers the rights and obligations of groups at heightened risk or identified as having special responsibilities, including perpetrators and survivors of sexual assaults, HIV-infected health care workers, prenatal transmission of HIV, and injection drug users. The final Part, AIDS in the World, examines the central issues of HIV/AIDS in the world: the absence of political leadership, the international trade system which militates against access to affordable treatment in poor countries, and the ethics of international collaborative research. The AIDS pandemic has reached deeply into all major spheres of modern life—e.g., law, medicine, economics, and politics. The pandemic has transformed society and restructured ethical values. This course provides an account of the major themes of the pandemic during the last two decades and offers an analysis of contemporary and future policy.

*3 credits, L. Gostin*

**NURS 518: Biomedical Ethics**

Bioethics is a field of study directed to the interdisciplinary ethical analysis of the moral dimensions of health professional practice; this includes an analysis of moral character and vision, judgment, decision-making, clinical practices, health policies, etc. Toward this end, the goals of this course are:

1. to introduce the wide range of ethical issues in health care;
2. the familiarize students with the bioethical literature that addresses these issues;

3. to develop the basic skills of analysis, interpretation, moral communication, and argument used in bioethics, especially as it affects nurses and physicians, functioning separately and jointly, and
4. to facilitate the application of those habits of thought that integrate bioethics into the intellectual and moral life of physicians and nurses.

*2 credits, D. Davis & C. Taylor*

#### **NURS 548: Health Systems & Policies in Transition**

This course examines the complex political, economic, and social forces that shape health care systems. It provides an introduction to general principles of health care organization, financing and regulation, and then sets forth a dynamic comparison of various approaches to health care delivery systems in different parts of the world. Current policy initiatives are analyzed for their impact on cost, quality, access and the health of populations. Students develop beginning skills in the epidemiological approach to population-based health care systems.

*3 credits, P. Cloonan*

#### **PBIO 519: Fundamentals of Biochemistry & Metabolism**

*Offered academic year 2012-2013*

This is a general biochemistry course suitable for students who have not previously taken a college biochemistry course. It covers metabolism of carbohydrates and fats, protein structure, function and metabolism, and related topics in basic biochemistry. Students may not receive credit for both PBIO-519 and NURS-519. (Prerequisites: Organic chemistry)

*3 credits, T. Sherman*

#### **STIA 445: Senior Seminar: Politics of International Health**

This class will explore the politics of international health. The world is becoming increasingly inter-related; trade relationships are becoming stronger and more intertwined, and travel between nations is fast and easy. The international movement of people and goods across national borders makes the emergence or re-emergence of infectious disease in one country of great importance to its region and the world community. Yet, traditional conceptions of state sovereignty can limit the ability of international organizations and foreign states to intervene.

Health threats can destabilize countries internally (for example, Stephen Lewis, the UN Special Envoy for HIV/AIDS in Africa, has stated that he "wouldn't discount the possibility, ten to fifteen years down the road, of failed states" as a result of HIV/AIDS) and can strain international relations. States often have powerful political and economic incentives to hide emerging diseases or downplay their importance. On the other hand, providing international assistance for public health disasters can strengthen international institutions and diplomatic relationships, increase stability, and save lives. This class examines international and national structures, relationships, and mechanisms that influence global health.

*3 credits, L. Stone*

#### **INTH 449: Health in Conflicts, Crises, and Disasters**

This new course will provide an opportunity for students to become acquainted with the problems related to emergencies and crisis situations and the methods used for preparedness, mitigation and cooperation among countries. Natural or manmade disasters, wars and conflicts, produce situations of emergency with high impact on the life of exposed population groups. There is a disruption of life conditions and the health of the people is, most of the time, immediately affected. There is substantial information on the causes, history, frequency, duration and consequences of the most important disasters, crisis and conflicts in the world, as well as the responses of local, national and international agencies and governments and the mistakes, accidents and lessons learned. Students will analyze information from historical and recent crises, emergencies and disasters using special reading material, videotapes of cases and simulations.

*3 credits, J. Teruel*

# Graduate Program Information

---

## Financial Aid

Student loans are available. For information, visit:

[http://www.georgetown.edu/home/student\\_finances.html](http://www.georgetown.edu/home/student_finances.html)

## Housing

For information, visit the Off-Campus Housing website at: [www.georgetown.edu/home/housing.html](http://www.georgetown.edu/home/housing.html)

## Application Deadlines

Fall Semester: June 1<sup>st</sup>

Spring semester: November 1<sup>st</sup>

**Online Application:** [http://grad.georgetown.edu/pages/apply\\_online.cfm](http://grad.georgetown.edu/pages/apply_online.cfm)

**Further Information:** <http://microbiology.georgetown.edu/education/>

**Program Contact:** Minnie An, *Graduate Program Coordinator*

Address: Department of Microbiology & Immunology  
Georgetown University Medical Center  
Medical-Dental Building, SW311  
3900 Reservoir Rd. NW  
Washington, D.C. 20057

Telephone: (202) 687-3422

E-mail: [ma554@georgetown.edu](mailto:ma554@georgetown.edu)

Web site: <http://microbiology.georgetown.edu/>